ML610Q380/383/384/385 Reference Board User's Manual

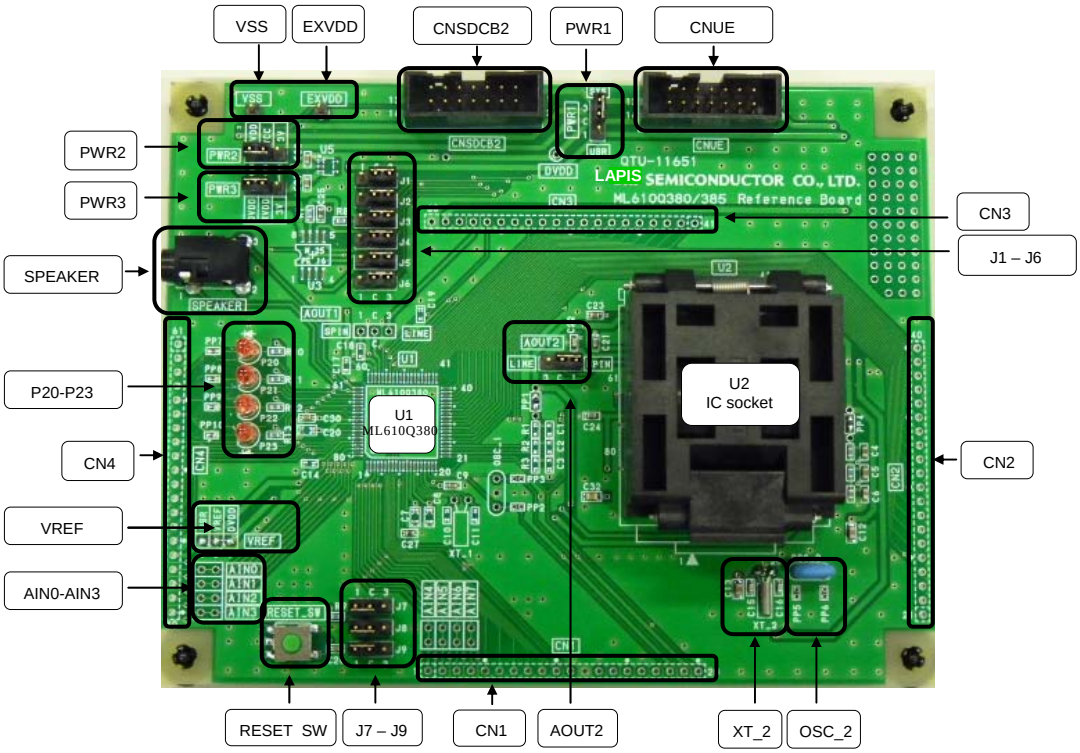
ML610Q380/383/384/385 Reference board is prepared by LAPIS Semiconduter to have you study the operations of ML610Q380/383/384/385.
The board is arranged so that necessary components are mounted by you according to your purpose, then only minimum necessary components are mounted on the board by LAPIS Semiconduter for brief use of ML610Q380/383/384/385.
By using the board with "uEASE on-chip debug emulator" (hereinafter referred to "uEASE") and "free sample U8 Development Tools CD-ROM" which is bundled in the package of uEASE not only Software development/debugging but also writing Flash ROM in the devices are capable.
This board also works in stand alone mode with external power suppy without uEASE.
Before starting works with this board, read below carefully and understand notices.

1. The board features
   Incorporates ML610Q380 or 80pin IC-Socket for ML610Q380/383/384/385
   Supports flash ROM programming and on-chip debugging (using TEST0 and TEST1_N pins)
   High extendibility; Through-holes for your peripheral board are equipped with microcontroller pins
   The power supply used can be selected (uEASE or peripheral board)
   Prepared the pad to mount parts (parts necessary for microcontroller operation)

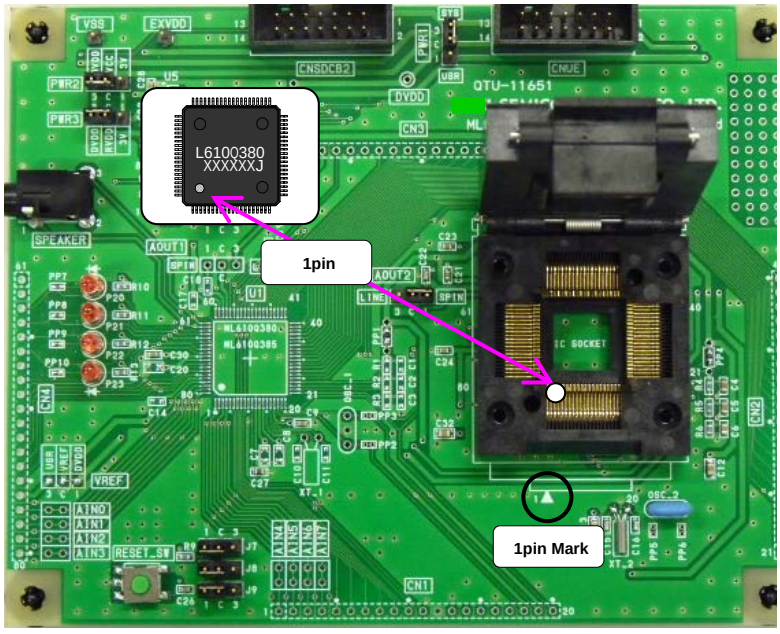
2. The board hardware specifications
   Please refer to the reference schematics for detail on connections of each hardware parts.

Embedded microcontroller	U1: 80pin IC socket for ML610Q380/383/384/385
Embedded parts	PWR1 – PWR3: Jumper for input power supply switch (3pin pin-header and short pin)
	AOUT2: Connection switch of a LINE output and a speaker amplifier analog input (3pin pin header and a short pin)
	J1-J9: Jumper for CNSDCB2 (3pin pin header and a short pin)
	RESET_SW: Reset switch for M25PE16
	SPEAKER: Jack for speaker connection
	R4 – R6: Resistance for LCD driver power supply
	R9: Pull-up resistance for RESET_N
	R10 – R13: Resistance for light emitting diodes (P20-P23)
	P20 - P23: Light emitting diodes
	CNUE: Connector for on-chip debug emulator (14pin connector)
	CNSDCB2: Connector for Sound Device Control Board2(SDCB2) (14pin connector)
	C4 – C6: Capacitors for LCD driver (3pieces)
	C9, C12−C13, C21, C23−C24, C28−C29, C30, C32: Capacitors for power supply (10 pieces)
	C10-C11 or C15-C16: Capacitors for XTAL(2pieces)
	C22: Capacitor for DC voltage elimination (1pieces)
	C26: Capacitor for reset (1pieces)
	XT_2: 32.768kHz oscillator (1pieces)
	OSC_2: 8MHz oscillator (1pieces)
Pads for mounting	AIN0-AIN7: Pads for SA-ADC input voltage
	CN1 - CN4: Pads for peripheral board connectors (10pin x 4, 2.54mm pitch)
	PP7-PP10: Land for light emitting diodes (P20-P23)
Other useful pads	DVDD, EXVDD, VSS, VREF, AIN0-AIN7
Operating voltage	DVDD=+2.2V - +5.5V（DVDD=+4.5V - +5.5V during playback using internal speaker）, VREF=+4.5V - +5.5V
Board size	110.00 x 140.00 mm

3. Parts layout



< fig.1 Parts layout >



< fig.2 Device set direction >

4. Jumper(3pin pin-header and short pin) set up

PWR1, AOUT2 jumper is set as follows.

Jumper Pin No.	Short (1) and (C) (1) (C) (3)	Short (C) and (3) (1) (C) (3)
PWR	USR：Use of user's power supply	SYS：Use of uEASE power supply
AOUT	SPIN：Use of internal speaker amplifier	LINE：Use of external speaker amplifier

PWR2, PWR3, J1－J8 jumpers shall be used by default status as follows.

Jumper Pin No.	The condition of connection	
PWR2	(1) (C) (3)	Short (C) and (3)
PWR3	(1) (C) (3)	Short (C) and (3)
J1	(1) (C) (3)	Short (1) and (C)
J2	(1) (C) (3)	Short (1) and (C)
J3	(1) (C) (3)	Short (1) and (C)
J4	(1) (C) (3)	Short (1) and (C)
J5	(1) (C) (3)	Short (1) and (C)
J6	(1) (C) (3)	Short (1) and (C)
J7	(1) (C) (3)	Short (1) and (C)
J8	(1) (C) (3)	Short (1) and (C)
J9	(1) (C) (3)	Short (1) and (C)

5. Notes on use

(1) The information contained herein can change without notice owing to product and/or technical improvements.
Before using the product, please make sure that the information being referred to is up-to-date.

(2) Before using this board, read carefully and understand the contents of the ML610Q380/383/384/385 user's manual and the uEASE user's manual.

(3) The engineering sample of ML610Q380 might be mounted on the board.
Therefore, please confirm the characteristic finally by using MP of ML610Q380 and customer's mass production boards.

(4) LAPIS Semiconduter will not provide any support for this board, but the board can be exchanged with a new product only when it has an initial failure.

(5) The device must be set under the condition that the power supply of the reference board is cut off. And, the reference board is to set it in the case of "the socket type" not to mistake the direction of the device. When a cap is opened, 1 pin direction is the bottom left side. Refer to < fig.2 Device set direction >.

(6) It is the pin for a check pin EXVDD to supply a power supply from the outside. Set up PWR1 on the “USR” side at that time.

(7) Notes when the PWR jumper is set to USR side and the uEASE is connected.
Turn on the power supply of the peripheral board after starting the uEASE..
Moreover, Stop the uEASE after turning off the power supply of the peripheral board.

(8) When the PWR jumper is set to the uE side, the ability to supply power of the uEASE is +3.3v/100mA.

(9) Notes when the RESET_N signal is prepared on the peripheral board side.
If you use the uEASE, open or set DVDD-level RESET_N signal pin (CN1_11pin).

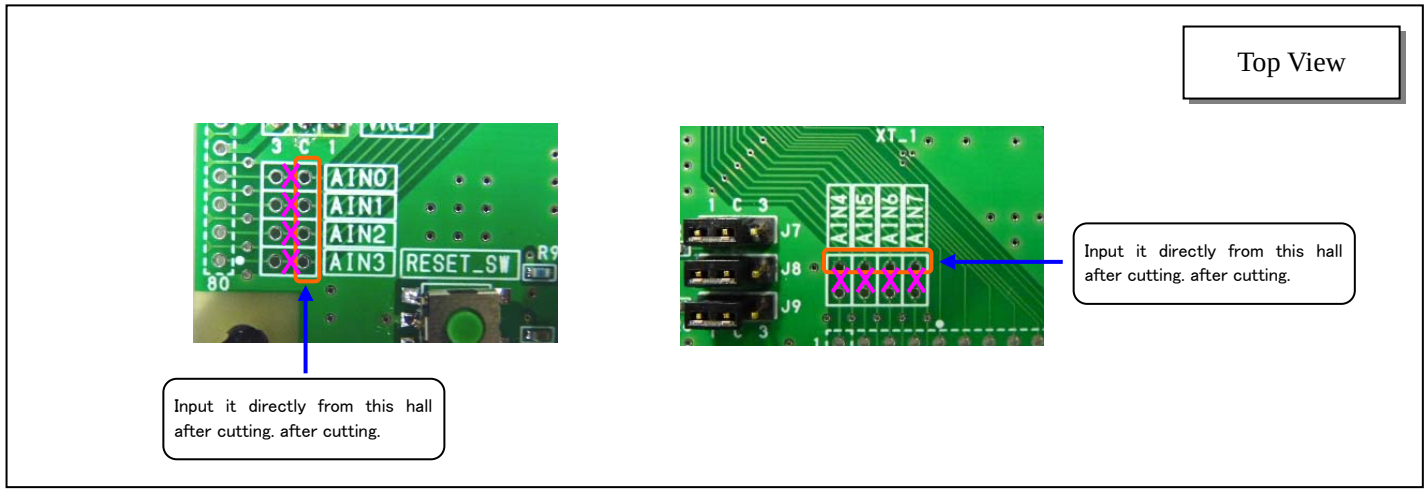
(10) There is a possibility of short the circuit when using it on electro conductive so that the board may have the pattern on the solder side. Therefore, please use the board on nonconductivity or put the protection parts on the solder side if necessary.

(11) When you use SA-ADC:
When input of the ADC is connected to AIN0-AIN7 on this board, please cut the pattern of AIN0-AIN7 as needed.
And please input from a hall of that is near to a device, as shown in the < fig3 >.
VREF is connected to VDD by a jumper. Please set the VREF jumper in the USER side when any voltage wants to input.
And please input the VREF voltage from CN4_16 pin (VREF_IN). Please refer to < fig4>.

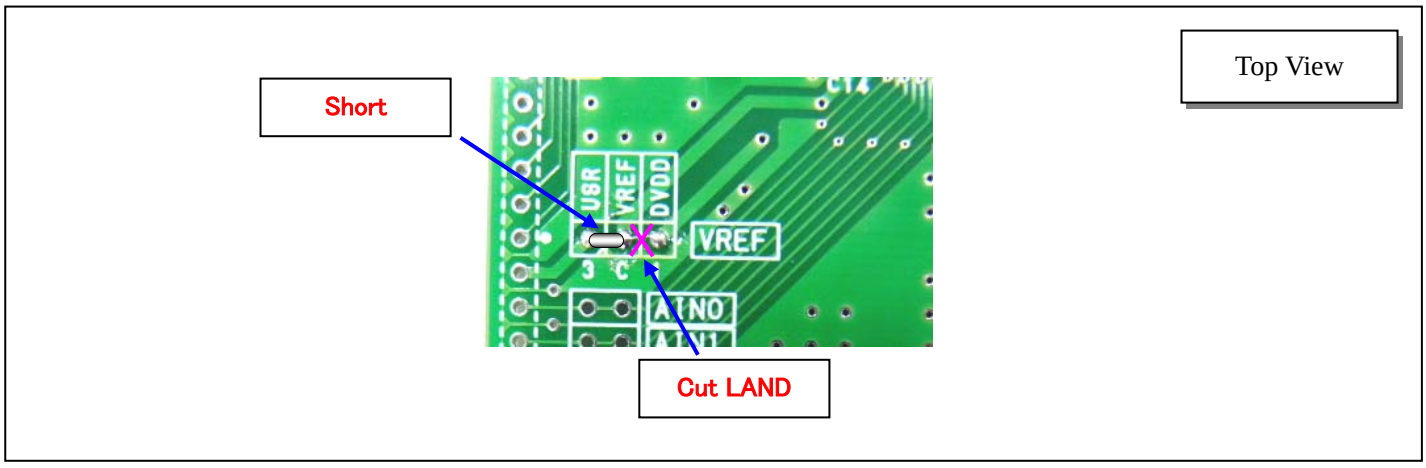
(10) When you don’t use light emitting diodes:
P20-P23 can drive direct to light emitting diodes. P20-P23 are wired with light emitting diodes through PP7 – PP10.
Please cut the land of the PP7 – PP10 when you don’t use light emitting diodes, as shown in the < fig.6 >.

(11) When you use light emitting diodes:
Between VL3 and VDD, tip resistance of 2012 size can be implemented.
Please implement tip resistance as needed in PP1/PP4. Please refer to <fig6>.

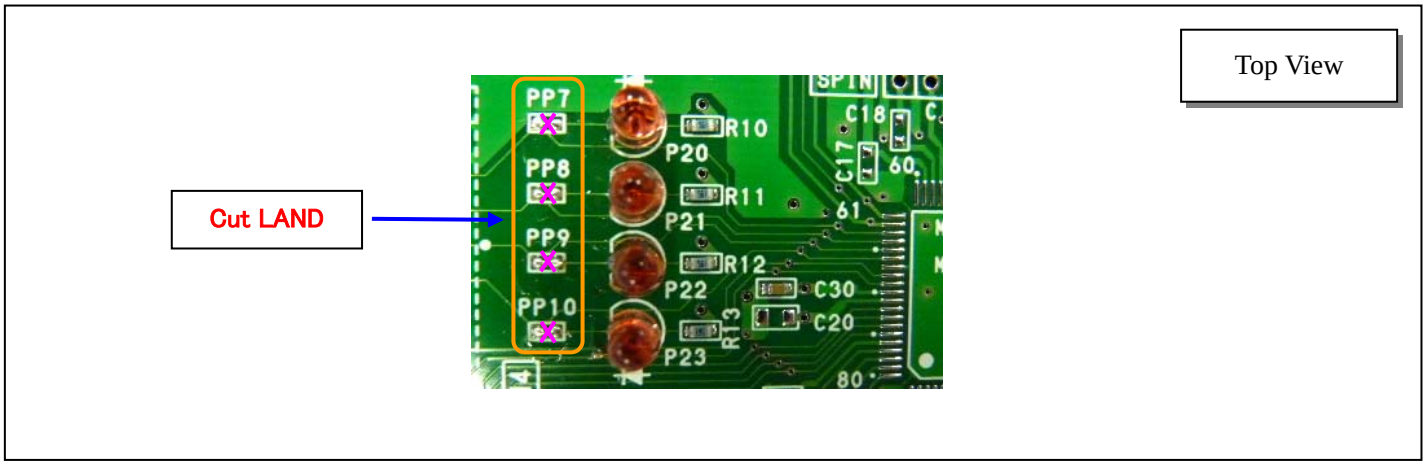
(12) When P10-P11 is used as a general-purpose input port.
P10-P10 can be used high-speed oscillator port and a general-purpose input port.
When you use it as a general-purpose input port, remove 8MHz oscillator, and short PP2 and PP5, PP3 and PP6 respectively, as shown in the < fig.7 >.



< fig.3. AIN0-AIN7 >

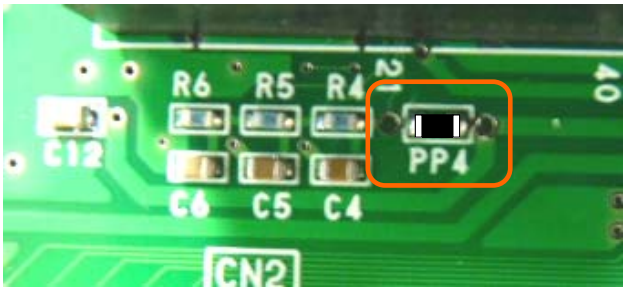


< fig4. VREF >



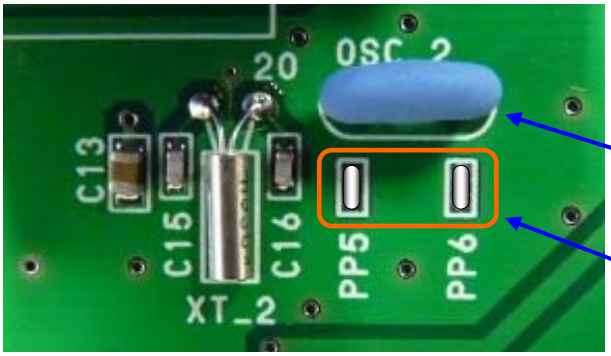
< fig5. light emitting diodes(P20-P23) >

Top View



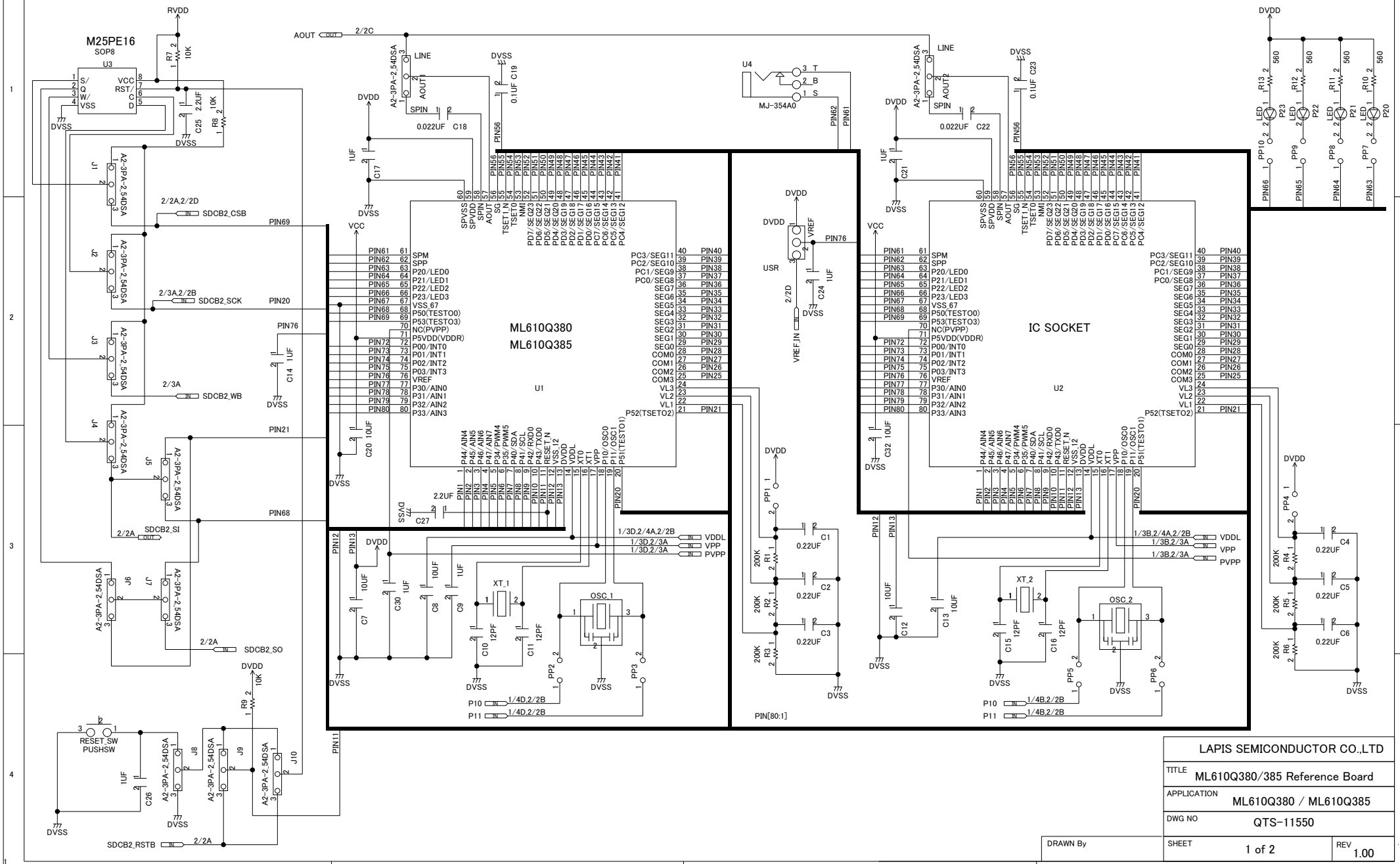
< fig6. LED >

Top View

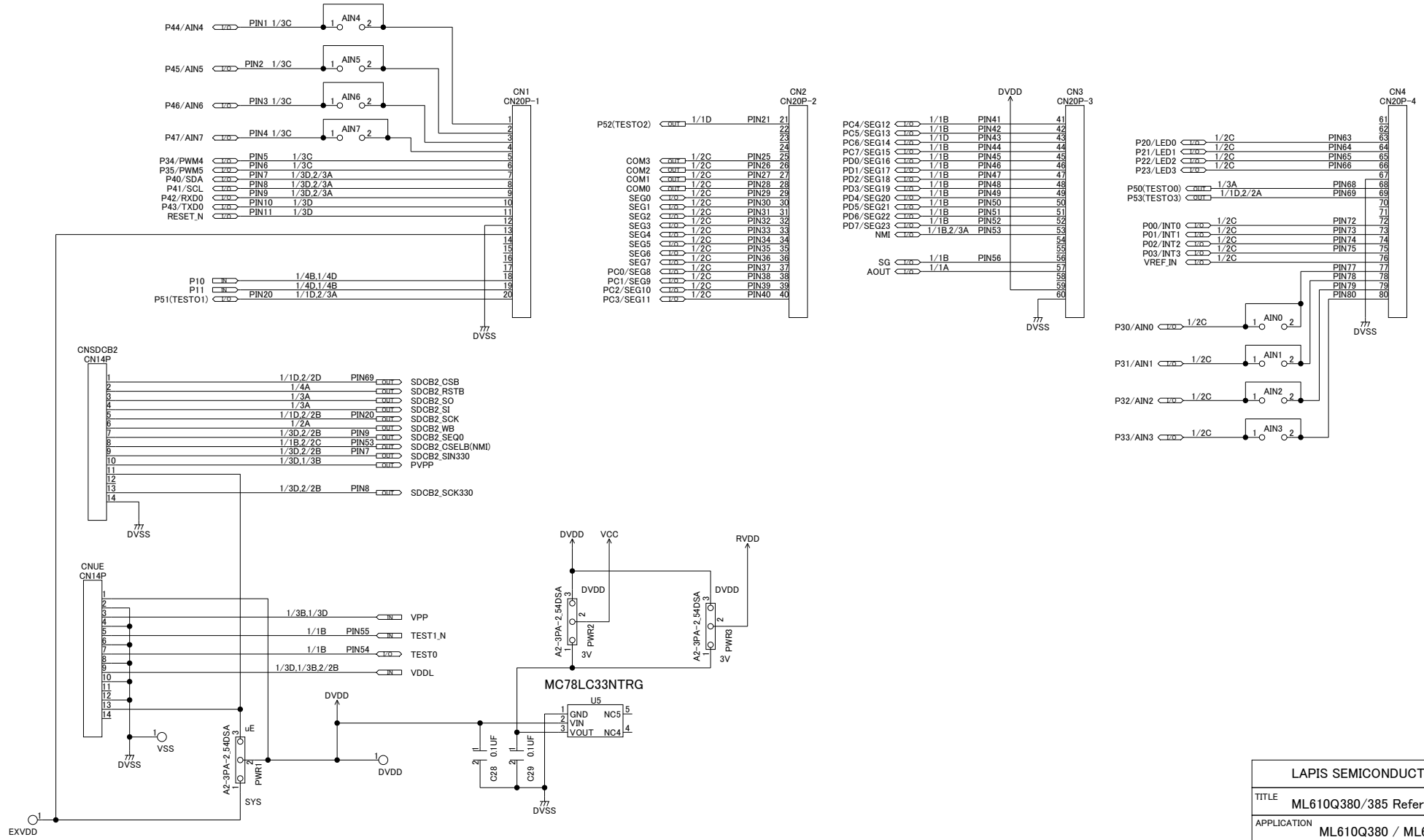


< fig7. OSC_2 >

6. Reference schematics:
The reference circuit diagram of this reference board is shown after the following page



LAPIS SEMICONDUCTOR CO.,LTD	
TITLE	ML610Q380/385 Reference Board
APPLICATION	ML610Q380 / ML610Q385
DWG NO	QTS-11550
DRAWN By	
SHEET	1 of 2
REV	1.00



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